

**Water Quality Assessment
Alfalfa Ditch to Fruitgrowers Reservoir
Town of Cedaredge WWTF**

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I. Water Quality Assessment Summary

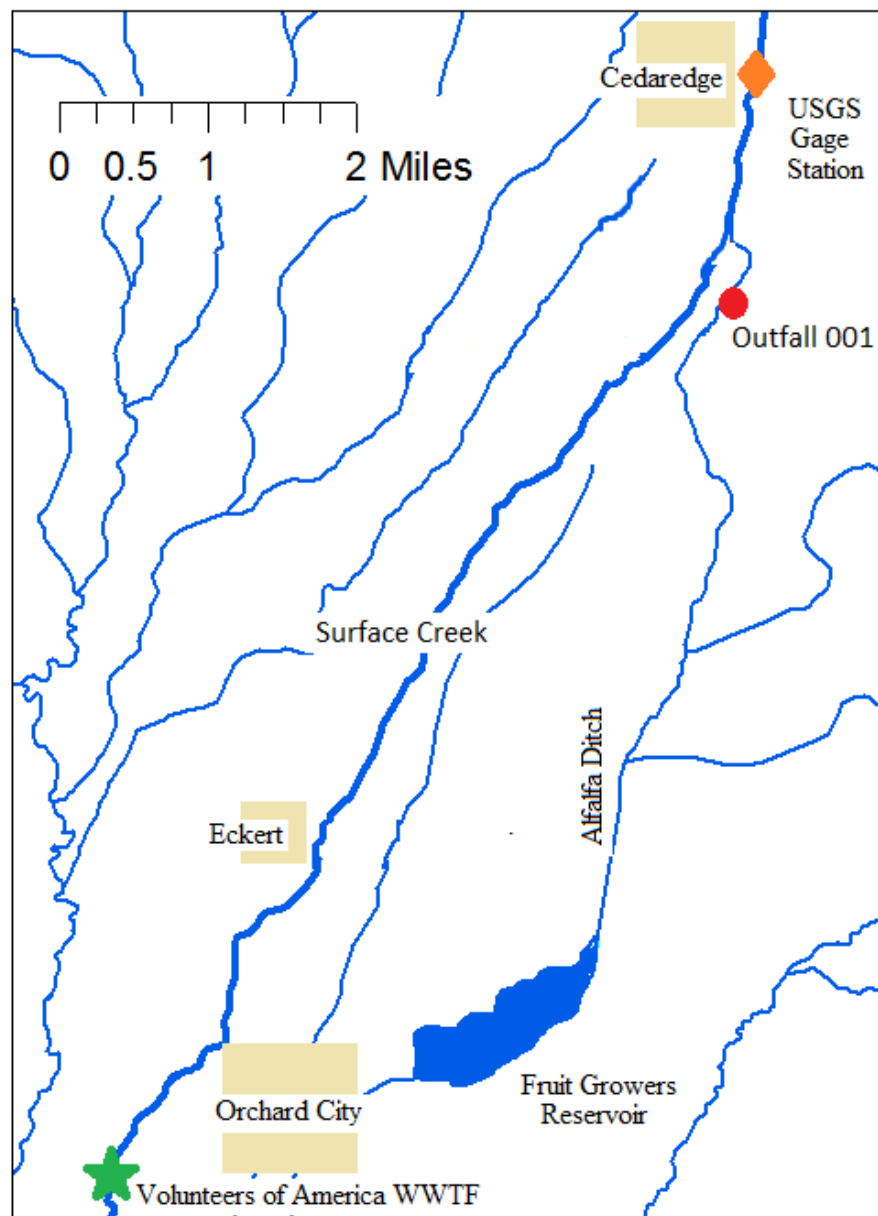
Table A-1 includes summary information related to this WQA. This summary table includes key regulatory starting points used in development of the WQA such as: receiving stream information; threatened and endangered species; 303(d) and Monitoring and Evaluation listings; low flow and facility flow summaries; and a list of parameters evaluated.

Table A-1 WQA Summary					
Facility Information					
Facility Name		Permit Number		Design Flow (max 30-day ave, MGD)	Design Flow (max 30-day ave, CFS)
Cedaredge WWTF		CO0031984		0.275*	0.43
Receiving Stream Information					
Receiving Stream Name		Segment ID	Designation	Classification(s)	
Alfalfa Ditch (a) to Fruitgrowers Reservoir (b)		(a) Unclassified waters (b) COGULG09	(a) NA (b) Use protected	(a) NA (b) Aquatic Life Warm 2 April-Oct: Recreation Class E November-March: Recreation Class P Agriculture	
Low Flows (cfs)					
1E3 (1-day)		7E3 (7-day)	30E3 (30-day)	Ratio of 30E3 to the Design Flow (cfs)	
0		0	0	0	
Regulatory Information					
T&E Species	303(d) (Reg 93)	Monitor and Eval (Reg 93)	Existing TMDL	Temporary Modification(s)	Control Regulation
No	Dissolved Oxygen	None	Yes (D.O./Total Phosphorus) Approval date by EPA: Feb 2, 2013	None	Reg 39
Pollutants Evaluated					
Ammonia, <i>E. Coli</i> , TRC, Temperature					

*For Outfall 001, two design flow tiers are used: 0.26 MGD (November through March) and 0.275 MGD (April through October).

II. Introduction

The Water Quality Analysis (WQA) of the Alfalfa Ditch and Fruitgrowers Reservoir near the Cedaredge Wastewater Treatment Facility (WWTF), located in Delta County, is intended to determine the assimilative capacities available for pollutants found to be of concern. This WQA describes how the water quality based effluent limits (WQBELs) are developed. These parameters may or may not appear in the permit with limitations or monitoring requirements, subject to other determinations such as reasonable potential analysis, evaluation of federal effluent limitation guidelines, implementation of state-based technology based limits, mixing zone analyses, 303(d) listings, threatened and endangered species listing, or other requirements as discussed in the permit rationale. Figure A-1 contains a map of the study area evaluated as part of this WQA.

FIGURE A-1

The Cedaredge WWTF currently discharges to the Alfalfa Ditch, an unclassified water that drains immediately to the Fruitgrowers Reservoir, which is stream segment COGULG09. This means the Gunnison River Basin, Lower Gunnison Sub-basin, Stream Segment 09. This segment is composed of the “Fruitgrowers Reservoir.” This discharge point will furthered be referenced as Outfall 001.

Information used in this assessment includes data gathered from the Cedaredge WWTF, the Division, the Colorado Division of Water Resources (DWR), the U.S. Environmental Protection Agency (EPA), the U.S. Geological Survey (USGS), and communications with the local water commissioner. The data used in the assessment consist of the best information available at the time of preparation of this PEL analysis.

III. Water Quality Standards

Narrative Standards

Narrative Statewide Basic Standards have been developed in Section 31.11(1) of the regulations, and apply to any pollutant of concern, even where there is no numeric standard for that pollutant. Waters of the state shall be free from substances attributable to human-caused point source or nonpoint source discharges in amounts, concentrations or combinations which:

for all surface waters except wetlands;

- (i) can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials which include but are not limited to anaerobic sludge, mine slurry or tailings, silt, or mud; or*
- (ii) form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or*
- (iii) produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species or to the water; or*
- (iv) are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or*
- (v) produce a predominance of undesirable aquatic life; or*
- (vi) cause a film on the surface or produce a deposit on shorelines; and*

for surface waters in wetlands;

- (i) produce color, odor, changes in pH, or other conditions in such a degree as to create a nuisance or harm water quality dependent functions or impart any undesirable taste to significant edible aquatic species of the wetland; or*
- (ii) are toxic to humans, animals, plants, or aquatic life of the wetland.*

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for any parameter of concern could be put in CDPS discharge permits.

Standards for Organic Parameters and Radionuclides

Radionuclides: Statewide Basic Standards have been developed in Section 31.11(2) and (3) of The Basic Standards and Methodologies for Surface Water to protect the waters of the state from radionuclides and organic chemicals.

In no case shall radioactive materials in surface waters be increased by any cause attributable to municipal, industrial, or agricultural practices or discharges to as to exceed the following levels, unless alternative site-specific standards have been adopted. Standards for radionuclides are shown in Table A-2.

Table A-2 Radionuclide Standards	
Parameter	Picocuries per Liter
Americium 241*	0.15
Cesium 134	80
Plutonium 239, and 240*	0.15
Radium 226 and 228*	5
Strontium 90*	8
Thorium 230 and 232*	60
Tritium	20,000

*Radionuclide samples for these materials should be analyzed using unfiltered (total) samples. These Human Health based standards are 30-day average values for both plutonium and americium.

Organics: The organic pollutant standards contained in the Basic Standards for Organic Chemicals Table are applicable to all surface waters of the state for the corresponding use classifications, unless alternative site-specific standards have been adopted. These standards have been adopted as “interim standards” and will remain in effect until alternative permanent standards are adopted by the Commission. These interim standards shall not be considered final or permanent standards subject to antibacksliding or downgrading restrictions. Although not reproduced in this PEL, the specific standards for organic chemicals can be found in Regulation 31.11(3).

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for radionuclides, organics, or any other parameter of concern could be put in CDPS discharge permits.

The aquatic life standards for organics apply to all stream segments that are classified for aquatic life. The water supply standards apply only to those segments that are classified for water supply. The water + fish standards apply to those segments that have a Class 1 aquatic life and a water supply classification. The fish ingestion standards apply to Class 1 aquatic life segments that do not have a water supply designation. The water + fish and the fish ingestion standards may also apply to Class 2 aquatic life segments, where the Water Quality Control Commission has made such determination.

Because Fruitgrowers Reservoir is classified for Aquatic Life Cold 2, without a water supply designation, aquatic life standards apply to discharge from this outfall.

Salinity

The Division’s policy, Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, may be applied to discharges where an agricultural water intake exists downstream of a discharge point. Limitations for electrical conductivity and sodium absorption ratio may be applied in accordance with this policy.

Temperature

Temperature shall maintain a normal pattern of diurnal and seasonal fluctuations with no abrupt changes and shall have no increase in temperature of a magnitude, rate, and duration deemed deleterious to the resident aquatic life. This standard shall not be interpreted or applied in a manner inconsistent with section 25-8-104, C.R.S.

Segment Specific Numeric Standards

Numeric standards are developed on a basin-specific basis and are adopted for particular stream segments by the Water Quality Control Commission. The standards in Table A-3 have been assigned to stream segment COGULG09 in accordance with the *Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins*.

Table A-3
In-stream Standards for Stream Segment COGULG09
<i>Physical and Biological</i>
Dissolved Oxygen (DO) = 5 mg/l, minimum
pH = 6.5 – 9.0 su
E.coli.: April 1 to Oct. 31 = 126/100ml Nov. 1 to March 31 = 205/100ml
Temperature: Jan-March = 13.2° C MWAT and 14.8° C DM April-Dec = 26.3° C MWAT and 29.5° C DM
<i>Inorganic</i>
Total Ammonia acute and chronic = TVS
Chlorine acute = 0.019 mg/l
Chlorine chronic = 0.011 mg/l
Free Cyanide acute = 0.005 mg/l
Sulfide chronic = 0.002 mg/l
Boron chronic = 0.75 mg/l
Nitrite acute = 0.05 mg/l
Nitrate acute = 100 mg/l
<i>Metals</i>
Dissolved Arsenic acute = 340 µg/l
Total Recoverable Arsenic chronic = 100 µg/l
Dissolved Cadmium acute and chronic = TVS
Dissolved Hexavalent Chromium acute and chronic = TVS
Dissolved Copper acute and chronic = TVS
Total Recoverable Iron chronic = 1000 µg/l
Dissolved Lead acute and chronic = TVS
Dissolved Manganese acute and chronic = TVS
Total Recoverable Molybdenum chronic = 160 µg/l
Total Mercury chronic = 0.01 µg/l
Dissolved Nickel acute and chronic = TVS
Dissolved Selenium acute and chronic = TVS
Dissolved Silver acute and chronic = TVS
Dissolved Zinc acute and chronic = TVS
Nonylphenol acute = 28 µg/l
Nonylphenol chronic = 6.6 µg/l

Table Value Standards and Hardness Calculations

As metals with standards specified as TVS are not included as parameters of concern for this facility, the hardness value of the receiving water and the subsequent calculation of the TVS equations is inconsequential and is therefore omitted from this WQA.

Total Maximum Daily Loads and Regulation 93 – Colorado’s Section 303(d) List of Impaired Waters and Monitoring and Evaluation List

Stream segment COGULG09 is on the impaired list for dissolved oxygen. For a receiving water placed on this list, the Restoration and Protection Unit is tasked with developing the Total Maximum Daily Loads (TMDLs) and the Waste Load Allocation (WLAs) to be distributed to the affected facilities.

The Division’s Restoration and Protection Unit has completed the TMDL for phosphorus, which included a consideration of dissolved oxygen in the TMDL development. The EPA approved the TMDL February 2, 2013, and the allocation of 18 kg of phosphorus per year for this facility is incorporated into this permitting action.

IV. Receiving Stream Information

Low Flow Analysis

The Colorado Regulations specify the use of low flow conditions when establishing water quality based effluent limitations, specifically the acute and chronic low flows. The acute low flow, referred to as 1E3, represents the one-day low flow recurring in a three-year interval, and is used in developing limitations based on an acute standard. The 7-day average low flow, 7E3, represents the seven-day average low flow recurring in a 3 year interval, and is used in developing limitations based on a Maximum Weekly Average Temperature standard (MWAT). The chronic low flow, 30E3, represents the 30-day average low flow recurring in a three-year interval, and is used in developing limitations based on a chronic standard.

Although there is periodic flow in the Alfalfa Ditch upstream of the Cedaredge WWTF, the monthly low flows are set at zero for June through October based on information provided by the local water commissioner. Specifically, the local water commissioner indicates that draws off of Alfalfa Ditch prior to the Cedaredge WWTF will empty the Alfalfa Ditch so that the in-stream flows are zero during these months. To determine the low flows available to the Cedaredge WWTF for November through May, daily diversion flow data for the Alfalfa Ditch were obtained from the DWR Colorado Decision Support Systems (CDSS). Flow data were available from November 2002 through October 2012.

Data were only available as a monthly average for this site, and thus were not adequate to obtain the annual 1E3, 7E3, and 30E3 low flows using U.S. Environmental Protection Agency (EPA) DFLOW software, which requires a minimum of three years of daily average flow data, with data points no more than 30 days apart. Thus, the 30E3 was manually calculated for November through May for each month from 2002 through 2012.

To calculate the annual 30E3, the harmonic mean of each month was calculated and the third lowest of the values for each month was designated the monthly low flow. The third lowest values were applied as the annual low flows as there were 10 years (recurrence interval) of data available. This practice is also applied in the EPA DFLOW model. Because the data were insufficient to calculate the 1E3 or the 7E3 (which requires at least one data point from each week in the month), these flows were set equal to the 30E3 low flow conditions.

The gage station, diversions, and time frames were deemed the most accurate and representative of current flows and were therefore used in this analysis. Based on the low flow analysis described previously, the upstream low flows available to the Cedaredge WWTF at the Alfalfa Ditch (Outfall 001) were calculated and are presented in Table A-4.

Table A-4														
Low Flows for the Alfalfa Ditch at the Cedaredge WWTF Outfall 001														
<i>Low Flow (cfs)</i>	<i>April- Oct</i>	<i>Nov- March</i>	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>
1E3 Acute	0.0	2.2	3.5	2.2	3.0	11.9	13.3	0.0	0.0	0.0	0.0	0.0	4.9	4.1
7E3 Chronic	0.0	2.2	3.5	2.2	3.0	11.9	13.3	0.0	0.0	0.0	0.0	0.0	4.9	4.1
30E3 Chronic	0.0	2.2	3.5	2.2	3.0	11.9	13.3	0.0	0.0	0.0	0.0	0.0	4.9	4.1

The ratio of the low flow of the Alfalfa Ditch at Outfall 001 to the Cedaredge WWTF design flow is 0:1

Mixing Zones

The amount of the available assimilative capacity (dilution) that may be used by the permittee for the purposes of calculating the WQBELs may be limited in a permitting action based upon a mixing zone analysis or other factor. These other factors that may reduce the amount of assimilative capacity available in a permit are: presence of other dischargers in the vicinity; the presence of a water diversion downstream of the discharge (in the mixing zone); the need to provide a zone of passage for aquatic life; the likelihood of bioaccumulation of toxins in fish or wildlife; habitat considerations such as fish spawning or nursery areas; the presence of threatened and endangered species; potential for human exposure through drinking water or recreation; the possibility that aquatic life will be attracted to the effluent plume; the potential for adverse effects on groundwater; and the toxicity or persistence of the substance discharged.

Unless a facility has performed a mixing zone study during the course of the previous permit, and a decision has been made regarding the amount of the assimilative capacity that can be used by the facility, the Division assumes that the full assimilative capacity can be allocated. Note that the review of mixing study considerations, exemptions and perhaps performing a new mixing study (due to changes in low flow, change in facility design flow, channel geomorphology or other reason) is evaluated in every permit and permit renewal.

If a mixing zone study has been performed and a decision regarding the amount of available assimilative capacity has been made, the Division may calculate the water quality based effluent limitations (WQBELs) based on this available capacity. In addition, the amount of assimilative capacity may be reduced by T&E implications.

For this facility, 100% of the available assimilative capacity may be used as the facility has not had to perform a mixing zone study, the low flow for the receiving ditch is zero, and the discharge is not to a T&E stream segment, is not expected to have an influence on any of the other factors listed above.

Ambient Water Quality

The Division evaluates ambient water quality based on a variety of statistical methods as prescribed in Section 31.8(2)(a)(i) and 31.8(2)(b)(i)(B) of the *Colorado Department of Public Health and Environment Water Quality Control Commission Regulation No. 31*, and as outlined in the Division's Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits (WQP-19). The ambient water quality was not assessed for the Alfalfa Ditch because the background in-stream low flow condition is zero, and because no ambient water quality data are available for the Alfalfa Ditch near the Town of Cedaredge WWTF discharge.

V. Facility Information and Pollutants Evaluated

Facility Information

The Cedaredge WWTF is located at approximately two miles south of Cedaredge along Harts Basin Rd; at 38°52'16" latitude North and 107°55'26" longitude West, in Delta County. The design capacity of the facility at Outfall 001 from April through October is 0.275 MGD (0.43 cfs), and from November through March is 0.26 MGD (0.40 cfs). Wastewater treatment is currently accomplished using aerated lagoons. The technical analyses that follow include assessments of the assimilative capacity based on this proposed treatment and design capacity.

Pollutants of Concern

Pollutants of concern may be determined by one or more of the following: facility type; effluent characteristics and chemistry; effluent water quality data; receiving water quality; presence of federal effluent limitation guidelines; or other information. Parameters evaluated in this PEL may or may not appear in a permit with limitations or monitoring requirements, subject to other determinations such as a reasonable potential analysis, mixing zone analyses, 303(d) listings, threatened and endangered species listings or other requirement as discussed in a permit rationale.

There are no site-specific in-stream water quality standards for BOD₅ or CBOD₅, TSS, percent removal, and oil and grease for this receiving stream. Thus, assimilative capacities were not determined for these parameters. The applicable limitations for these pollutants can be found in Regulation No. 62 and will be applied in the permit for the WWTF.

The following parameters were identified by the Division as pollutants to be evaluated for this facility:

- Total Residual Chlorine
- *E. coli*
- Ammonia
- Temperature

Based upon the size of the discharge, the lack of industrial contributors, dilution provided by the receiving stream and the fact that no unusually high metals concentrations are expected to be found in the wastewater effluent, metals are not evaluated further in this WQA.

According to the *Rationale for Classifications, Standards and Designations of the Gunnison River*, there are no existing public water supply uses downstream from the Town of Cedaredge WWTF at either outfall. For this reason, the nitrate standard, which is applied at the point of intake to a water supply, is not evaluated as part of this analysis.

During assessment of the facility, nearby facilities, and receiving stream water quality, no additional parameters were identified as pollutants of concern.

VI. Determination of Water Quality Based Effluent Limitations (WQBELs)

Technical Information

Note that the WQBELs developed in the following paragraphs, are calculations of what an effluent limitation may be in a permit. The WQBELs for any given parameter, will be compared to other potential limitations (federal Effluent Limitations Guidelines, State Effluent Limitations, or other applicable limitation) and typically the more stringent limit is incorporated into a permit. If the WQBEL is the more stringent limitation, incorporation into a permit is dependent upon a reasonable potential analysis.

In-stream background data and low flows evaluated in Sections II and III are used to determine the assimilative capacity for pollutants of concern, and to calculate the WQBELs. For all parameters except ammonia, it is the Division's approach to calculate the WQBELs using the lowest of the monthly low flows (referred to as the annual low flow) as determined in the low flow analysis. For ammonia, it is the standard procedure of the Division to determine monthly WQBELs using the monthly low flows, as the regulations allow the use of seasonal flows.

The Division's standard analysis consists of steady-state, mass-balance calculations for most pollutants and modeling for pollutants such as ammonia. The mass-balance equation is used by the Division to calculate the WQBELs, and accounts for the upstream concentration of a pollutant at the existing quality, critical low flow (minimal dilution), effluent flow and the water quality standard. The mass-balance equation is expressed as:

$$M_2 = \frac{M_3Q_3 - M_1Q_1}{Q_2}$$

Where,

- Q_1 = Upstream low flow (1E3 or 30E3)
- Q_2 = Average daily effluent flow (design capacity)
- Q_3 = Downstream flow ($Q_1 + Q_2$)
- M_1 = In-stream background pollutant concentrations at the existing quality

M_2 = Calculated WQBEL

M_3 = Water Quality Standard, or other maximum allowable pollutant concentration

When Q_1 equals zero, such as occurs at Outfall 001 from April through October, Q_2 equals Q_3 , and the following results:

$$M_2 = M_3$$

In the Alfalfa Ditch from November through March, when the low flow is not zero, the upstream background pollutant concentrations used in the mass-balance equation will vary based on the regulatory definition of existing ambient water quality. For most pollutants, existing quality is determined to be the 85th percentile. For metals in the total or total recoverable form, existing quality is determined to be the 50th percentile. For pathogens such as fecal coliform and *E. coli*, existing quality is determined to be the geometric mean.

For temperature, the highest 7-day mean (for the chronic standard) of daily average stream temperature, over a seven consecutive day period will be used in calculations of the chronic temperature assimilative capacity, where the daily average temperature should be calculated from a minimum of three measurements spaced equally through the day. The highest 2-hour mean (for the acute standard) of stream temperature will be used in calculations of the acute temperature assimilative capacity. The highest 2-hour mean should be calculated from a minimum of 12 measurements spaced equally through the day.

Calculation of WQBELs

Using the mass-balance equation provided in the beginning of Section VI, the acute and chronic low flows set out in Section IV, ambient water quality as discussed in Section IV, and the in-stream standards shown in Section III, the WQBELs for were calculated.

Where a WQBEL is calculated to be a negative number and interpreted to be zero the Division standard procedure is to allocate the water quality standard to prevent further degradation of the receiving waters.

Chlorine: There are no point sources discharging total residual chlorine within one mile of the Cedaredge WWTF. Because chlorine is rapidly oxidized, in-stream levels of residual chlorine are detected only for a short distance below a source. Ambient chlorine was therefore assumed to be zero.

***E. coli*:** There are no point sources discharging *E. coli* within one mile of the Cedaredge WWTF. Thus, WQBELs were evaluated separately. In the absence of *E. coli* ambient water quality data, fecal coliform ambient data are used as a conservative estimate of *E. coli* existing quality. For *E. coli*, the Division establishes the 7-day geometric mean limit as two times the 30-day geometric mean limit and also includes maximum limits of 2,000 colonies per 100 ml (30-day geometric mean) and 4,000 colonies per 100 ml (7-day geometric mean). This 2000 colony limitation also applies to discharges to ditches.

Temperature: At Outfall 001, discharge is to an unclassified ditch, and therefore no temperature standards apply. Thus, temperature standards for only the downstream Fruitgrowers Reservoir apply. A

WQBEL for temperature can only be calculated if there is representative data, in the proper form, to determine what the background Maximum Weekly Average Temperature and Daily Maximum ambient temperatures are. As this data is not available at this time, the temperature limitation will be set at the water quality standard and will be revisited in the future when representative temperature data becomes available.

The data used and the resulting WQBELs, M_2 , are set forth in Tables A-5a and A-6a for chronic standards and in Tables A-5b and A-6b for acute standards.

Table A-5a						
Chronic WQBELs, Outfall 001 Alfalfa Ditch to Fruitgrowers April - October						
<i>Parameter</i>	<i>Q₁ (cfs)</i>	<i>Q₂ (cfs)</i>	<i>Q₃ (cfs)</i>	<i>M₁</i>	<i>M₃</i>	<i>M₂</i>
<i>E. coli</i> (#/100 ml)	0	0.43	0.43	112	205	205
TRC (mg/l)	0	0.43	0.43	0	0.011	0.011

Table A-5b						
Acute WQBELs, Outfall 001 Alfalfa Ditch to Fruitgrowers, April - October						
<i>Parameter</i>	<i>Q₁ (cfs)</i>	<i>Q₂ (cfs)</i>	<i>Q₃ (cfs)</i>	<i>M₁</i>	<i>M₃</i>	<i>M₂</i>
<i>E. coli</i> (#/100 ml)	NA	NA	NA	NA	NA	410
TRC (mg/l)	0	0.43	0.43	0	0.019	0.019

Table A-6a						
Chronic WQBELs, Outfall 001, Alfalfa Ditch to Fruitgrowers November – March						
<i>Parameter</i>	<i>Q₁ (cfs)</i>	<i>Q₂ (cfs)</i>	<i>Q₃ (cfs)</i>	<i>M₁</i>	<i>M₃</i>	<i>M₂</i>
<i>E. coli</i> (#/100 ml)	2.2	0.4	2.6	112	205	717
TRC (mg/l)	2.2	0.4	2.6	0	0.011	0.072

Table A-6b						
Acute WQBELs, Outfall 001, Alfalfa Ditch to Fruitgrowers November – March						
<i>Parameter</i>	<i>Q₁ (cfs)</i>	<i>Q₂ (cfs)</i>	<i>Q₃ (cfs)</i>	<i>M₁</i>	<i>M₃</i>	<i>M₂</i>
<i>E. coli</i> (#/100 ml)	NA	NA	NA	NA	NA	1434
TRC (mg/l)	2.2	0.4	2.6	0	0.019	0.12

Ammonia: The Ammonia Toxicity Model (AMMTOX) is a software program designed to project the downstream effects of ammonia and the ammonia assimilative capacities available to each discharger based on upstream water quality and effluent discharges. To develop data for the AMMTOX model, an in-stream water quality study should be conducted of the upstream receiving water conditions, particularly the pH and corresponding temperature, over a period of at least one year.

Temperature data reflecting upstream ambient receiving water conditions were available for Surface Creek, and thus also the Alfalfa Ditch. Temperature data were gathered from USGS Station 09143500 (Surface Creek at Cedaredge, CO) for a period of record from January 1994 through October 2004. Temperature data were also gathered from USGS Station 09143000 (Surface Creek near Cedaredge,

CO). Additional temperature data as well as pH were gathered from USGS Station 385708107533701 (Surface Creek AB.Milk Creek, at U50 Road) and USGS Station 384816107593801 (Surface Creek at 1975 Road, near mouth) from a single data point for each on 6/26/2000. The data, reflecting a period of record from January 1994 through April 2005, were used to establish the setpoint and average temperature headwater conditions in the AMMTOX model.

Upstream ammonia data for each month were not available. Thus, the mean total ammonia concentration found in nearby and hydrologically connected Surface Creek, as sampled at WQCD sample site 10582 (Surface Creek near mouth, and equal to 0.12 mg/l, was used as an applicable upstream ammonia concentration reflective of each month.

There were no pH or temperature data available for the Cedaredge WWTF that could be used as adequate input data for the AMMTOX model. Therefore, the Division standard procedure is to rely on statistically-based, regionalized data for pH and temperature compiled from similar facilities and receiving waters.

The AMMTOX model may be calibrated for a number of variables in addition to the data discussed above. The values used for the other variables in the model are listed below:

- Stream velocity = $0.3Q^{0.4d}$
- Default ammonia loss rate = 6/day
- pH amplitude was assumed to be medium
- Default times for pH maximum, temperature maximum, and time of day of occurrence
- pH rebound was set at the default value of 0.2 su per mile
- Temperature rebound was set at the default value of 0.7 degrees C per mile.

The results of the ammonia analyses for the Cedaredge WWTF for Outfall 001 are presented in Table A-7.

Table A-7 AMMTOX Results for the Alfalfa Ditch at the Cedaredge WWTF at Outfall 001		
<i>Design of 0.275 MGD (0.43 cfs, April-October)</i> <i>Design of 0.26 MGD (0.4 cfs, November-March)</i>		
<i>Month</i>	<i>Total Ammonia Chronic (mg/l)</i>	<i>Total Ammonia Acute (mg/l)</i>
January	11	21
February	12	22
March	14	27
April	22	43
May	29	57
June	4.6	17
July	3.9	17
August	4.1	19
September	4.0	17
October	4.5	17
November	14	26

December	13	25
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VII. Antidegradation Evaluation

As set out in *The Basic Standards and Methodologies for Surface Water*, Section 31.8(2)(b), an antidegradation analysis is required except in cases where the receiving water is designated as “Use Protected.” Note that “Use Protected” waters are waters “that the Commission has determined do not warrant the special protection provided by the outstanding waters designation or the antidegradation review process” as set out in Section 31.8(2)(b). The antidegradation section of the regulation became effective in December 2000, and therefore antidegradation considerations are applicable to this PEL analysis.

According to the *Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins*, stream segment COGULG09 is Use Protected. Thus, an antidegradation review is required for this segment if new or increased impacts are found to occur.

VIII. Technology Based Limitations

Regulations for Effluent Limitations

Regulation No. 62, the Regulations for Effluent Limitations, includes effluent limitations that apply to all discharges of wastewater to State waters, with the exception of storm water and agricultural return flows. These regulations are applicable to the discharge from the proposed discharge.

Table A-8 contains a summary of the applicable limitations for pollutants of concern at this facility.

Table A-8			
Regulation 62 Based Limitations			
<i>Parameter</i>	<i>30-Day Average</i>	<i>7-Day Average</i>	<i>Instantaneous Maximum</i>
BOD ₅	30 mg/l	45 mg/l	NA
TSS	75 mg/l	110 mg/l	NA
BOD ₅ Percent Removal	85%	NA	NA
Total Residual Chlorine	NA	NA	0.5 mg/l
pH	NA	NA	6.0-9.0 s.u.
Oil and Grease	NA	NA	10 mg/l

IX. References

Regulations:

The Basic Standards and Methodologies for Surface Water, Regulation 31, Colorado Department Public Health and Environment, Water Quality Control Commission, effective 1/31/2013.

Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins, Regulation No. 35, Colorado Department Public Health and Environment, Water Quality Control Commission, effective 6/30/2013.

Regulations for Effluent Limitations, Regulation 62, CDPHE, WQCC, 3/30/2008.

Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List, Regulation 93, Colorado Department Public Health and Environment, Water Quality Control Commission, effective 3/30/2012.

Policy and Guidance Documents:

Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, 12/2001.

Memorandum Re: First Update to (Antidegradation) Guidance Version 1.0, Colorado Department Public Health and Environment, Water Quality Control Division, 4/23/2002.

Rationale for Classifications, Standards and Designations of Segments of the Gunnison River, Colorado Department Public Health and Environment, Water Quality Control Division, effective 7/2006.

Policy Concerning Escherichia coli versus Fecal Coliform, CDPHE, WQCD, 7/20/2005.

Colorado Mixing Zone Implementation Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, effective 4/2002.

Policy for Conducting Assessments for Implementation of Temperature Standards in Discharge Permits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-23, effective 7/3/2008.

Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-24, effective 3/10/2008.

Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-19, effective 5/2002.